

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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The undersigned hereby certifies that this Transmittal Letter and the paper or fee, as described herein, are being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

By:

*Kari Arnold*  
Lee Thao Kari Arnold

PRELIMINARY AMENDMENT

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Please enter the following preliminary amendment into the above-referenced application.

ABSTRACT

Please insert the attached abstract into the application as the last page thereof.

CLAIMS

Please delete claims 1-33 as follows. Please enter new claims 34-66 as follows. A clean copy of the entire set of claims is included below.

34. (NEW) A receiver for receiving signals which are at least partially known and which have followed a plurality of different paths to said receiver, said receiver comprising:

an arrangement for dividing the area of coverage of said receiver into a plurality of sections;

a plurality of receiving units, each of said receiving units being arranged to process a different one of said signals to identify said at least partially known part of said signal;

a controller coupled to the output of said dividing arrangement for selecting the signals which are to be allocated to the respective receiving units; and

an interference removing arrangement coupled to the output of said receiver units to remove interference based on signal information from a plurality of different sections.

35. (NEW) A receiver as claimed in claim 1, wherein said dividing arrangement comprises a beamformer.

36. (NEW) A receiver as claimed in claim 35, wherein said beamformer provides orthogonal beams.

37. (NEW) A receiver as claimed in claim 34, wherein the interference removing arrangement is arranged to filter out coloured interference.

38. (NEW) A receiver as claimed in claim 34, wherein the interference removing arrangement comprise a plurality of interference removing units with a interference removing unit being coupled to the output of each of the receiving units.

39. (NEW) A receiver as claimed in claim 38, wherein each interference removing unit uses signal information from a plurality of different sections.

40. (NEW) A receiver as claimed in claim 34, wherein each receiving unit is arranged to use signal information from three different sections.

41. (NEW) A receiver as claimed in claim 40, wherein each receiving unit is arranged to consider the signal information from the section from which the signal allocated to the associated receiving unit has been received, and the adjacent sections on either side thereof.

42. (NEW) A receiver as claimed in claim 38, wherein a combiner is provided for combining the output of the interference removing units to provide a single signal.

43. (NEW) A receiver as claimed in claim 34, wherein each of the receiving units is arranged to determine values which are used by said interference removing arrangement.

44. (NEW) A receiver as claimed in claim 43, wherein each of said receiving units is arranged to calculate the channel impulse response of said allocated signal from said given one of the sections.

45. (NEW) A receiver as claimed in claim 44, wherein each of said receiving units is arranged to calculate the channel impulse response of said allocated signal from said given one of the section and from the adjacent sections on either side thereof.

46. (NEW) A receiver as claimed in claim 44, wherein each of said receiving units is arranged to calculate an average channel impulse response.

47. (NEW) A receiver as claimed in claim 43, wherein each of said receiving units is arranged to calculate the difference between the desired signal and the received signal.

48. (NEW) A receiver as claimed in claim 45, wherein each of said receiving units is arranged to calculate the difference between the desired signal and the received signal for the given one of the sections from which the allocated signal is received and the adjacent sections on either side thereof to define a vector  $q$ .

49. (NEW) A receiver as claimed in claim 47, wherein each of said receiving units is arranged to calculate an average difference between said desired and received signals.

50. (NEW) A receiver as claimed in claim 49, wherein a matrix is defined by  $q \cdot q^H$  where  $q^H$  is the vector  $q$  transposed and the values thereof replaced by complex conjugates.

51. (NEW) A receiver as claimed in claim 45, wherein each of said interference removing units is arranged to receive the channel impulse response values and said matrix from the respective receiving unit.

52. (NEW) A receiver as claimed in claim 50, wherein each said interference removing unit is arranged to receive an average of the matrices of said receiving units and channel impulse response values.

53. (NEW) A receiver as claimed in claim 52, wherein a weighting is determined from said matrix and said channel impulse response values, said weighting being applied to said signal.

54. (NEW) A receiver as claimed in claim 53, wherein said weighting is applied to said signal from the allocated section and the signals from the adjacent sections on either side thereof.

55. (NEW) A receiver as claimed in claim 53, wherein said weighting is defined by:

$((\text{the inverse of said matrix}) \times (\text{the channel impulse response values}))^H$

where H means that the inverse and complex conjugates are taken.

56. (NEW) A receiver as claimed in claim 38, wherein each said interference removing unit applies weighting to the received signal from at least the section allocated to the associated receiving unit, whereby the effects of interference are cancelled.

57. (NEW) A receiver as claimed in claim 35, wherein the beamformer arrangement comprises a Butler matrix.

58. (NEW) A receiver as claimed in claim 34, wherein the controller comprises means for determining the presence of said signals in each of said sections.

59. (NEW) A receiver as claimed in claim 58, wherein the determining means is arranged to determine the strength of the signals.

60. (NEW) A receiver as claimed in claim 58, wherein the determining means comprises a plurality of separate units, each one being arranged to process signals from a respective one of said sections.

61. (NEW) A receiver as claimed in claim 34 wherein the plurality of receiver units define a RAKE receiver.

62. (NEW) A receiver as claimed in claim 34, wherein said signals are in the code division multiple access format.

63. (NEW) A receiver as claimed in claim 34, wherein said at least partially known part of said signals comprise at least one pilot symbol.

64. (NEW) A receiver as claimed in claim 34, wherein said receiving units process said different one of said signals by correlating the signal with information on said at least partially known part thereof.

65. (NEW) A base station incorporating a receiver for receiving signals which are at least partially known and which have followed a plurality of different paths to said receiver, said receiver comprising:

an arrangement for dividing the area of coverage of said receiver into a plurality of sections;

a plurality of receiving units, each of said receiving units being arranged to process a different one of said signals to identify said at least partially known part of said signal;

a controller coupled to the output of said dividing arrangement for selecting the signals which are to be allocated to the respective receiving units; and

an interference removing arrangement coupled to the output of said receiver units to remove interference based on signal information from a plurality of different sections.

66. (NEW) A mobile station incorporating a receiver for receiving signals which are at least partially known and which have followed a plurality of different paths to said receiver, said receiver comprising:

an arrangement for dividing the area of coverage of said receiver into a plurality of sections;

a plurality of receiving units, each of said receiving units being arranged to process a different one of said signals to identify said at least partially known part of said signal;

a controller coupled to the output of said dividing arrangement for selecting the signals which are to be allocated to the respective receiving units; and

an interference removing arrangement coupled to the output of said receiver units to remove interference based on signal information from a plurality of different sections.

**REMARKS**

The above preliminary amendment is made to insert an abstract page into the application and to enter new claims 34-66.

Applicant respectfully requests that this preliminary amendment be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicant's attorney of record, Michael B. Lasky at 952-912-0527.

Respectfully submitted,

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